

Understanding e-learning: an opportunity for Europe?

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SUMMARY

The article begins with the new media themselves and with the question of what technical potential the new information and communication technologies have and why they exert so much influence on the debate about learning and teaching. It goes on to show why a technological approach to e-learning not only has limitations but also involves risks. Consequently, it appears necessary to adopt a learning-oriented approach to e-learning. The hypothesis is that one must first understand learning per se in order to be able to promote e-learning. A heuristic framework model has been designed to show that technical decisions come at the end of a chain of decisions that relate, or should relate, primarily to education and teaching. It was only possible to discuss briefly the opportunities that e-learning offers for learning in Europe, if we assume a pedagogic approach. E-learning in Europe opens up new possibilities for various forms and methods of learning, but there are major obstacles if the emphasis remains on the technological approach.

Introduction

E-learning is a collective umbrella term describing the broad field of education with and by means of new technologies. In this sense, e-learning has developed in a meteoric and conflicting fashion; while some people extol the benefits of the new information and communication technologies and see a digital world of education evolving, others complain about mistakes, or promises ranging from illusionary to false. It may be easier to understand this changeable and conflicting story by way of an *analogy*.

People want to be mobile, to get from A to B and back cheaply, quickly and safely; this desire was and is the motivating force behind the history of *mobility* in general and *auto mobility* in particular.

The dream of driving became a reality for a few people only – and to a limited extent – with the first motorised carriages at the end of the nine-

teenth century. Today, more than a century later, we sit in cars with powerful engines and intelligent microelectronics. When Henry Ford came up with his idea of cars for all, everybody laughed at him. Soon, however, a programme of road-building came along that amazed the doubters. As cars became faster and more numerous, roads became wider and acquired more lanes, the road network became denser and the provision of petrol stations more comprehensive. Today's car driver needs multifaceted training, not only in accelerating, braking and steering, but also in order to be able to operate electronic equipment in the car, cope with heavy traffic, and overcome complex risk situations. In contrast to the early days of the car, today driving schools are an essential component of the 'auto mobility' system. So it can be concluded that technical developments in car manufacturing, the expansion of infrastructures and individual skills acquisition were and are largely attuned to one another in the area of auto mobility. The motivating force was the dream of driving – and this is still true today.

The motivating force behind the story of learning with new media in general and e-learning in particular is the new information and communication technologies (ICTs), with a view to bringing the benefits of technology into educational institutions and making learning and teaching more up to date in them. However, there were no clear ideas (and this is often still the case) about exactly what 'more up to date' means and what the precise purpose of the new technologies might be. It is not so much a dream of 'learning and education' and appropriate teaching/learning concepts, but more the availability of the Internet and of efficient storage and carrier media that influences the development of e-learning, especially in practice.

But is that not equivalent to building roads with no cars or would-be drivers? Even now, in many cases e-learning provision has to be aligned with selected learning management systems (Baumgartner *et al.*, 2002); the editing of the content for use with the media concerned has to be geared to storage capacities and bandwidths. It is as if the development of the car had been made dependent on arbitrary road widths, surfaces and parking-space sizes. As a rule, teachers and learners are put onto the information highway without preparation and with inadequate support, to find motorised carriages travelling on it as well as general-purpose vehicles and cabriolets.

To sum up, you do not need to be either a car enthusiast or a frequent car user to concede that in the context of e-learning, the history of auto mobility could have provided some useful lessons on *systematic* development and *motivating force*. This is apparent because the development of didactic concepts and appropriate provision for e-learning, technical progress in the information and communication sector, and the skills acquisition of individual learners and teachers are not always (well) attuned to one another; development tends instead to be *fragmented*. The new technologies were, and still are, the motivating force, and I shall go on to investigate the question of whether this dominance of technology in education really gets us any further.

New technologies and their potential for learning

Without a doubt, the new ICTs have, as the name suggests, opened up more possibilities for us in the area of information and communication. Information and communication are two fundamental pillars of learning that play a key role in *all* learning settings (school, university, continuing training, vocational training) (see also Back *et al.*, 1998).

Distribution, representation and exploration

Today, with the aid of the Internet and Intranets, it is possible for us to make information accessible and to distribute it easily and quickly, irrespective of time and place – I call this *the new technologies' distribution function*.

Multimedia tools of all kinds open up many ways of presenting information in various systems of symbols, combining text, illustrations and animation, and incorporating audio and video into hypermedia systems – I call this *the new technologies' representation function*.

Planning games, simulations and microworlds are examples of technical tools that make information not only clearer, but also even manipulable – I call this *the new technologies' exploration function*.

Distribution, representation and exploration of information – there are many *examples* confirming that the new technologies fulfil these functions well:

- The student seeking essays and research results on the Internet for a piece of homework is learning via information distributed thanks to electronic networking. The university lecturer who makes his publications available online is also using the new media's *distribution function*, *inter alia* to support the learning of others.
- The employee who finds out how a new piece of equipment functions via computer-based training is profiting from multimedia information and using it to increase his knowledge. And the teacher who makes use of a video-based learning programme in class is using the *representation function* of the new media to make his lesson more vivid.
- When managers practise managing an enterprise in a planning game, using a time-lapse program, this involves active, virtually hands-on learning, which is made possible by manipulating processes and providing immediate feedback. Virtual laboratories at universities avoid high-risk experiments in reality; this too is feasible thanks only to the *exploration function* of the new media.

Communication and collaboration

In the above examples, learning via interaction is added to learning via information. However, interaction with the subject (for this, see Schulmeister, 2004) is only *one* aspect of the possibilities for interaction – the field of digital education opens up interaction with other learners, teachers and experts.

- The Internet and other networks not only serve to distribute information, but are also the basis for various forms of synchronous and asynchronous interaction between people via email, forums, chatrooms and video conferences; so here we are seeing *the new technologies' communication function*.
- Tools from the area of *computer-supported cooperative work* (CSCW) go even further; not only do they make it possible for people in different places to communicate, but they also support cooperation in order to solve a task or an actual problem jointly. I call this *the new technologies' collaboration function*.

Communication and collaboration – here too there are examples showing that the new technologies can take on both these tasks in many ways:

- For example, email projects in school language classes use the *communication function* of the new media in the same way that newsgroups on the Internet do. The first example refers to learning opportunities in educational institutions and the second to new learning paths in an informal context.
- Cooperative casework in separate groups is found in continuing training, at least at higher management levels, and also in university teaching; thanks to the new technologies' *collaboration function*, such complex learning scenarios are becoming possible and more common, at least when cost/benefit-oriented thinking does not predominate, since although collaboration using new media is effective, it is also costly for both learners and teachers.

The range of learning and teaching with new media

While in practice various combinations of all these functions of the new media are encountered in learning and teaching, separation of them can only ever be analytical in nature. For example, complex computer- or *web-based training* combines multimedia and interactivity and hence uses the representation *and* exploration functions simultaneously. Learning scenarios relying on communication and collaboration usually also offer information on the same learning platform that can be used to process tasks. Here, the communication, collaboration *and* distribution functions become interlinked. Simulations can also be handled cooperatively in separate groups; here, the collaboration *and* exploration functions are deliberately combined.

These are only a few examples, and there is also the increasing combination of virtual and face-to-face learning to create *blended learning* scenarios (Reinmann-Rothmeier, 2003).

To sum up, the fact that there are many definitions of e-learning means that ultimately it remains unclear precisely which of the functions of new technology noted above are involved. Thus it can easily be imagined how imprecise most of the designations are and how wide the field of possible forms of learning that may be subsumed under e-learning in the broadest sense. It follows that, on the one hand, people should state exactly what they are talking about in this field; a small point, but nonetheless not something that can be taken for granted. On the other hand, it also follows that there is an extensive range of learning and teaching with new media, insofar as teachers and designers bring with them didactic ability *and* didactic imagination (Schulmeister, 2001), in order to be able to take advantage of this range. At the same time, this is the keyword for the next point, the argument in favour of a pedagogic approach to e-learning, which is more than necessary, given the many traps inherent in the technological approach.

Limitations and risks of the technological approach

In the 1990s, it was widely believed that learning with new technologies saved time and money, improved effectiveness and was also much more fun than conventional learning. Almost all these expectations have proved to be at least exaggerated.

- For example, not a few learners have fallen into the *speed trap* – the hope that with computer-based training, one will learn a foreign language, a great deal faster, for instance, cannot usually be fulfilled, since learning cannot be speeded up at will. Learning takes time, with or without the new media (see Siebert, 2001).
- Trade and industry were particularly badly affected by the *cost trap* – the expectation that learning with new media would save not only time but also money on continuing training was largely disappointed. Many enterprises have cut back their initially euphoric e-learning plans for electronic mass training in simple know-how and skills. The boom in learning platforms has died down and people at many fairs and conferences have become more critical (e.g. Riekhof and Schüle, 2002).
- Even many an academic has fallen into the *effectiveness trap* in learning with new media; although admittedly more and more studies not mentioning any *fundamental* benefits of learning with multimedia and the Internet have been appearing since the mid-1990s (e.g. Astleitner, 2003). Despite this, even now media projects are often given financial backing in accordance with criteria that are less than transparent, usu-

ally also without any exact knowledge of where, when and how the new media can really make learning better and more lasting (Multimedia Kontor Hamburg and MMB Institut für Medien- und Kompetenzforschung, 2004).

- There remains the *fun trap*: with the triumphant progress of the computer, for a long time people gave themselves up to the hope that at last there would be an end to the trials and tribulations of learning. However, even the assumption that learning could always be fun proved to be a fallacy. In many ways learning is work, associated with concentration and effort. The fact that effort can, of course, provide satisfaction, and that it is essential for virtual learning to connect to the learner's emotions, is another story (e.g. Reinmann/Rothmeier, 2004). However, it is a fact that learning in virtual environments is not like either a visit to the cinema or the hustle and bustle of a theme park.

Many of these traps, and others, result from a technological – one might almost say *technocratic* – approach to e-learning. What is missing here is a forward-looking dream of education and learning. Although there are many good didactic concepts for utilising technological potential (see, for example, Niegemann *et al.*, 2004), these are far too rarely found in practice or in the minds of decision-makers. Instead, it appears to be above all technical possibilities that provide the framework within which learning too is now to become faster, more effective, cheaper and more fun. Or, to return to our earlier analogy, wide roads, routes to every part of the earth and a petrol station on every corner invite people to drive, although only a few of them are imbued with a desire to drive and hardly any decent cars are available – not to mention the ability to drive.

Naturally the 'learning with new media' sector is not made up entirely of *technocrats*, who focus on the technology and believe that pedagogy must be brought into line with it. However, recent studies (e.g. Aviram and Talmi, 2004) show that technocrats in this sense still constitute a powerful group, especially in the context of decision-makers in the world of politics, in trade and industry and in big organisations. This should be making us feel apprehensive. Even if big media projects also have pedagogues or psychologists on board, the starting point is still often the technology, for which a pedagogic application is then – at least – sought.

However, from the point of view of education and learning, would it not be much more fruitful to focus primarily on *pedagogic* aims and then to seek technologies, or to promote technologies that can serve pedagogic purposes? In my view, here too the right motivating force is lacking, there is a lack of specific conceptions of learning and educational goals in our society today, conceptions to which the development of e-learning plans and technological infrastructures could be geared. Against this background, an argument must be put forward in support of a *learning-oriented* approach to e-learning, and this argument will be made in more detail in the next section.

A learning-oriented approach to learning

Different qualities of learning

Thinking and acting in a learning-oriented way means first looking more closely at the different qualities and the wealth of facets of learning. As everyone knows from their own experience, learning is not always the same: the kind of learning and the quality of learning experienced depend on *where* one learns (e.g. at school, on the job or in one's free time), *with whom* one learns (e.g. on one's own, with others or from a teacher), *what feelings* are associated with the learning (e.g. enthusiasm, reluctance, irritation or curiosity), *how freely* the learning can be structured (e.g. guided or self-determined), and much more besides. What is to be learned is also extremely important, where 'what' does not necessarily mean content such as English, German or mathematics, but the *quality* of the *knowledge* aimed at as the result of learning (see Baumgartner and Payr, 1999). This question of 'what' also always involves 'to what end'. For example, learning may mean the acquisition of simple know-how or skills, the incorporation of new information into existing knowledge, and the expansion of one's horizons or the effort on one's own part to generate knowledge, collect experience and participate in a community's activities.

These are all different levels of quality or intensity of learning, namely *knowledge acquisition*, *understanding* and *learning by doing* (Siebert, 2001), although this does not mean that one level is fundamentally of higher quality than another. The three levels of learning cited are quite simply different, functioning differently in different situations, they are described and explained more or less adequately by different theoretical approaches to teaching and learning, *and* they can be more or less adequately supported by different methods and media. Our own experience again shows us how important it is to differentiate learning in this way; learning the art of typing and mastering the vocabulary of a foreign language represent the *acquisition of know-how or skills*. The mere acquisition of know-how is vastly different from self-study at a university or participation in a management seminar: here, *understanding* is involved. This in turn is not really comparable with the lengthy processes of acclimatisation to a trade or with the development of the ability to act in new roles, which can be described as *learning by doing*.

All this is called learning, but it would be a meaningless undertaking to try to describe the processes involved by means of a *single* theory; nor can the support measures required really be depicted in a *single* model of teaching and learning; and it would be pointless to offer the same media repertoire in all cases. Learning is not always the same; and this also applies to learning with new technologies. So great scepticism should be the response to showy promises professing that many learning and educational prob-

lems can be resolved at once with the aid of a *single* model, a *single* platform or even a *single* magic tool.

Mental dimensions of learning

The fact that a distinction can and must be made between different quality levels of learning is one thing. Naturally, different forms of learning also have things in common, and these lie in the *mental dimensions* of learning, making it a phenomenon whose wealth of facets is often criminally disregarded (e.g. Wild *et al.*, 2001).

First, learning is always an active process; even mere listening is not a passive process. When we are learning, this also always means that we are perceiving, taking in, processing, retaining something, remembering and evaluating something: learning is a *cognitive* act.

If the impetus and willingness to learn are lacking, we develop neither know-how nor understanding, and absolutely no ability to act; people who actually learn are also *motivated* to do so.

Enthusiasm and reluctance, anger and joy, curiosity and irritation, all these are desired or undesired companions of learning: learning is also always accompanied by *feelings*.

And finally, in many ways learning is bound up with *social* and sociocultural aspects: even when learning takes place not in groups, but individually.

Cognition, motivation, emotion and social interaction are the most important dimensions of learning and are equally involved in knowledge acquisition, understanding and learning by doing, even if to differing extents. To reduce learning one-sidedly above all to its *cognitive aspect* would probably in many cases play a part in the non-fulfilment of high expectations of new models of teaching and learning or new media in education.

To sum up at this point, those who intend to design e-learning environments and promote virtual education must *understand learning* and have an interest in learning and learners. In current educational practice, however, little of this is to be felt. It is very obvious that the technocratic paradigm has been the force behind many virtual learning environments. I intend to use a *heuristic framework model* for designing e-learning environments to show that this is neither meaningful nor necessary.

Heuristic framework model for designing virtual learning environments

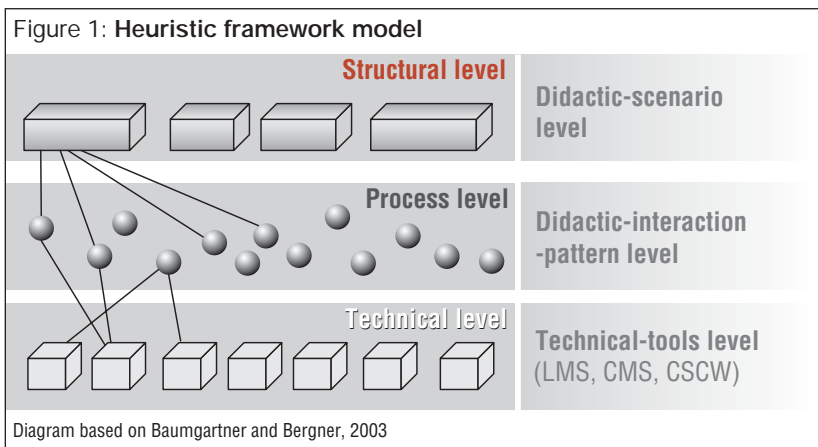
This model distinguishes between three levels of abstraction of e-learning environments (Baumgartner and Bergner, 2003), didactic scenarios, patterns of didactic interaction, and technical tools (see Fig. 1):

- The *didactic scenarios* are at the top. This means whole arrangements of methods which, between them, form a coherent learning en-

vironment or a structure for learning. For that reason, I also call it the *structural level*. It is not laid down in advance how a didactic scenario will be implemented. At this level, it is also still largely irrelevant whether the didactic scenario will be implemented in face-to-face learning or in virtual environments.

- The middle level involves various activities on the part of those involved in the learning events. Here, Baumgartner and Bergner speak of *patterns of didactic interaction*. These are concrete processes of learning and exchange, such as question and answer sequences, tasks and instructions and the ensuing actions, the creation of groups and so on. This level can also be described as the *process level*. Here it does already make a difference whether the learning is to be face-to-face or virtual; however, here too technical details are still largely of no interest.
- Only at the bottom level of technical tools is it a matter of *specific software products*, such as learning platforms, content management systems and CSCW tools ⁽¹⁾. Here we are for the first time dealing with the *technical level*. In this model one cannot judge whether it is sensible, productive or absurd to employ particular technical tools until one knows what processes are to be executed or aimed at with them, and in what didactic scenario they are embedded.

Competences at all three levels are required in order to design and apply e-learning environments. First one has to be capable of creating didactic scenarios. There are no mechanically applicable rules for this, at most only heuristics (e.g. Niegemann *et al.*, 2004); here, in addition to subject knowledge, it is above all experience that is called for. Those who not only design learning environments but also act as teachers within them must also be competent at the process level and capable of providing flexible support for individual and social learning processes in the virtual space (in the sense of tele-tutoring, tele-moderating, etc.). In addition to a basic



⁽¹⁾ CSCW stands for computer-supported cooperative work.

knowledge of psychology and pedagogy, this also involves practice and *learning by doing*.

At the technical level of *software products*, one is entitled to hope to be able to rely on practicable taxonomies in the long term, which help one to decide which software products or which of their functions are suitable for which teaching and learning processes and which are not. Something is already known about this (e.g. Schulmeister, 2003; Baumgartner; Häfele; Maier-Häfele, 2004). Here we can indeed expect to see, at least in the long term, a technology of the kind postulated by the advocates of *educational or instructional technology*.

To sum up, the goals of learning and education should set the tone when it comes to designing e-learning environments. In the same way that the 'dream of driving' has made the development of auto mobility into a success story, it is probably only a genuinely *pedagogic impetus* that can help to ensure that e-learning can provide true added value in teaching and learning situations. In addition to these goals – or even visions – *and* a fundamental understanding of the phenomenon of learning, we need *teachers* who create didactic scenarios with knowledge and a necessary measure of experience and imagination, who select (or even demand) the appropriate technical tools, and provide professional support for the ensuing processes in e-learning. However, this necessitates *competences* that cannot be acquired any more arbitrarily or quickly than is the case with driving in high-tech cars on our busy roads. This finding on the consequences for teachers in initial and continuing training leads to the last point, namely the question of what opportunities and challenges e-learning, with all its diversity, may hold for the new Europe.

E-learning in Europe: opportunities for lifelong learning?

As was shown at the beginning of the article, e-learning is merely a collective term for a confused and diverse group of learning forms with new ICTs. Thus e-learning can mean a lot of things: obtaining information on the Internet, learning via multimedia, actively testing new content, and/or learning through communication and collaboration in the virtual space.

Lifelong learning via informal and institutionalised learning

An in-depth look at the subject shows that this colourful bouquet of learning forms also contains new possibilities for *informal learning* (e.g. Dohmen, 2001). The distribution and communication functions of the new media in particular open up new paths for us to acquire knowledge, expand our horizons and get to know different viewpoints even without educational insti-

tutions. On the other hand, other functions of the new technologies, like the representation, exploration and collaboration functions, usually need to be employed by professional media designers, in order to be able to incorporate them meaningfully into learning environments or create individual learning environments from them. Thus these functions are potentially of value to *institutionalised learning* in particular.

On the subject of e-learning in Europe, there is, exceptionally, widespread agreement that there is a need to utilise the opportunities offered by the new media for both informal and institutionalised learning. There is also agreement on the *grounds* for these promotional aims – it is not only for humanistic reasons that education, learning and skills acquisition are worthwhile. They are also of increasing economic and political importance. In this context, there is also talk of abolishing the boundaries of pedagogy (e.g. Arnold, 1996), which simply means that alongside institutionalised learning in schools, universities, continuing training or vocational training, informal learning too should no longer be hidden, overlooked or disregarded. The new media have given new impetus to this debate.

Informal learning – this can take place at regional level, but also within organisations; it can be promoted by suitable framework conditions, but it can also effectively be prevented by false signals. Informal learning can be very successfully combined with institutionalised learning, and it is precisely here that the new media could assume a valuable bridging function – I say ‘could’, because this would necessitate a genuinely *learning-oriented* approach, as described earlier.

The EU intends to spend EUR 44 million between 2004 and 2006 within the framework of a new e-learning programme on e-twinning of schools in Europe, the development of virtual campuses and the promotion of digital literacy. As the EU itself puts it, with the *elearningeuropa* portal it has offered interested parties a tool that will help to modernise and improve education in Europe. These are all important signs – signs that point towards lifelong learning and lifelong skills acquisition going beyond traditional educational institutions. However, all this will bear little fruit unless trade and industry and educational institutions apply an *in-depth* understanding of the complex phenomenon of learning, unless there is a *genuine* interest in promoting learning, and as long as a genuinely *learning-oriented* approach remains the exception rather than the rule.

- There are *enterprises* that do indeed extol knowledge and hence also learning as being the most promising resource for the future. At the same time, however, they refuse to provide time and free space for learning processes on the job, or denigrate phases of reflection as being inefficient. Contradictions like this make *no* contribution to lifelong skills acquisition; even technically mature Intranets and web-based training programmes can do nothing to change this. Here, not only is the idea of education and learning in economic contexts lacking, but so too is the necessary respect for learning and human potential.

- There are *universities* that, in addition to technological infrastructures, now also support many model projects that are expensively developed into e-learning measures capable of being high-performing, but which are one-offs and isolated. Yet they too are doing the idea of learning without boundaries no favours when, as is so often the case, learning provision is discontinued following injections of capital, when content and supports are no longer available to learners when they complete their studies, when e-learning expertise remains in the hands of a few pioneers. Here too, there is no seriously intended idea of education and learning that holds promise for the future, and the courage to embrace the new is lacking, the courage to break up ossified university structures and processes – ultimately, this too bears witness to a lack of respect for the possibilities of human learning.
- The picture is no different in many *schools* – the financial commitment to improving technical equipment in schools not infrequently degenerates into individual measures effective for advertising purposes; even today, teacher training and advanced training do not get to grips with the requirements of media didacticism and media technology. New technologies are not resulting in any new teaching methods. And as long as schools fail to think seriously about what kind of education they do and do not want, as long as there are no definitive changes in structures and processes in classrooms, teacher training colleges and head teachers' offices, the idea that e-learning will bring about a lasting change in learning is and remains a pious hope.

Conclusions

There is no doubt that the new *technologies* have potential for learning. I have listed as the most important functions the fact that the new media make access to information easier, that they use many systems of symbols to present information and they even make it manipulable, that they open up new communication routes, and facilitate cooperation irrespective of time and place. The various functions of the new technologies can be combined to form interesting e-learning scenarios. The e-learning concept is accordingly a broad one, and anything but clear.

However, from the pedagogic point of view, concentrating exclusively on what is technically feasible leads to a number of traps, whose existence should no longer surprise anyone today. E-learning per se resolves no educational problems and does not make time and effort in learning (and also in teaching) redundant. Despite these insights and this experience, despite positive developments and scientific findings on learning with new media, alongside a few reformists many technocrats still control important decisions, and are either completely unaware of pedagogic and didactic concepts or are unwilling or unable to implement them. In practice at least, we probably still lack anything like a shared dream of education and learn-

ing as the motivating force behind development and, in particular, behind implementation of good concepts and technologies that serve the *learner* – and not vice versa.

Against this background, I have argued in favour of a *learning-oriented* approach and of making an effort to understand and respect the phenomenon of learning in all its complexity. In the context of designing e-learning environments, as the heuristic framework model was designed to show, the place of technical decisions is not at the beginning, but at the end. Technical decisions are not redundant in e-learning, but nor are they of primary importance; they are not trivial, but nor are they any more complex than the quest for suitable didactic scenarios. It follows that the designing of e-learning environments should *not* be in the hands of computer scientists, but in the hands of pedagogues, who are in a position to communicate and cooperate with experts with technical experience.

Europe can profit from the new technologies above all if it succeeds in interlinking and promoting institutionalised *and* informal learning. This does not apply only to vocational training, but is of particular relevance to it (e.g. Euler *et al.*, 2004). The EU has recognised this challenge, and is launching e-learning initiatives and providing financial support, but money alone cannot make e-learning successful. The triumphant progress of the car was based on human desire and systematic development of technology, infrastructure and skills. However, we shall go on waiting for the frequently conjured up, but very little seen, triumphant progress of e-learning if the *pedagogic* motivating forces, ideas and wishes continue to be lacking, or if they are not vigorously pursued. E-learning will continue along its contradictory course if investment in educational *practice* continues to flow *primarily* into the technology, while other components of human learning tend to be left out, if technological development is pursued in a way that leaves people *out of account* and not *on behalf of* learning. ■

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